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EXAMINER

MM92/0915

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ART UNIT

PAPER NUMBER

2811

DATE MAILED: 09/15/00

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS

☒ This application has been examined ☒ Responsive to communication filed on 7/7/00 ☒ This action is made final.

A shortened statutory period for response to this action is set to expire 3 month(s), — days from the date of this letter.
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

- | | |
|---|---|
| 1. <input type="checkbox"/> Notice of References Cited by Examiner, PTO-892. | 2. <input type="checkbox"/> Notice of Draftsman's Patent Drawing Review, PTO-948. |
| 3. <input type="checkbox"/> Notice of Art Cited by Applicant, PTO-1449. | 4. <input type="checkbox"/> Notice of Informal Patent Application, PTO-152. |
| 5. <input type="checkbox"/> Information on How to Effect Drawing Changes, PTO-1474. | 6. <input type="checkbox"/> |

Part II SUMMARY OF ACTION

1. ☒ Claims 87-91, 95-114 are pending in the application.
Of the above, claims — are withdrawn from consideration.
2. ☐ Claims — have been cancelled.
3. ☐ Claims — are allowed.
4. ☒ Claims 87-91, 95-114 are rejected.
5. ☐ Claims — are objected to.
6. ☐ Claims — are subject to restriction or election requirement.
7. ☐ This application has been filed with informal drawings under 37 C.F.R. 1.85 which are acceptable for examination purposes.
8. ☐ Formal drawings are required in response to this Office action.
9. ☐ The corrected or substitute drawings have been received on —. Under 37 C.F.R. 1.84 these drawings are ☐ acceptable; ☐ not acceptable (see explanation or Notice of Draftsman's Patent Drawing Review, PTO-948).
10. ☐ The proposed additional or substitute sheet(s) of drawings, filed on —, has (have) been ☐ approved by the examiner; ☐ disapproved by the examiner (see explanation).
11. ☐ The proposed drawing correction, filed —, has been ☐ approved; ☐ disapproved (see explanation).
12. ☐ Acknowledgement is made of the claim for priority under 35 U.S.C. 119. The certified copy has ☐ been received ☐ not been received ☐ been filed in parent application, serial no. —; filed on —.
13. ☐ Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.
14. ☐ Other

EXAMINER'S ACTION

DETAILED ACTION

Drawings

1. The drawings are objected to by the examiner for improper cross hatching. All the parts shown in section should be cross hatched according to MPEP 608.02, page 600-84.

Drawing corrections in compliance with MPEP 608.02(v) are required.

Specification

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Treatment of Claims Based on Language and Format

35 U.S.C. § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 88 and 90-91 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 88, "sharp point" is indefinite. It is unclear what constitutes a point. Mathematically, a point is a one-dimensional object. Physically, such an object does not exist. Therefore, point is commonly used to refer to an end which is small. In the present art, where everything is small, it is unclear what is meant by a point. Moreover, sharp is a relative term.

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In claim 90, "is formed as a part of" is indefinite, because its meaning is unclear as indicated in the previous office action. If this phrase means that the tip is connected to or integral with a cantilevered structure, as noted in the response of 7/7/00, then the phrase should be amended to state "is connected to." Alternatively, the claim can state that the interconnection component is a cantilevered structure. In any case, the current language of the claim is unclear.

In claim 91, "relatively flexible" is indefinite, because the range defined by "relatively flexible" is not clear. Further, it is not even clear relative to what this comparison is being made.

Treatment of Claims Based on Prior Art

35 U.S.C. § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 87-91, 95, 98-102, 106-110 and 112-114 are rejected under 35 U.S.C. 102(b) as being anticipated by Kanji et al. (US 5067007, hereafter Kanji).

Claim 87: Kanji discloses resilient elongated element (11), figures 1A, 1C and D., which has a contact tip structure (the end adjacent the surface (4)).

Claim 88: The tip structure is formed with an end which is considered as a sharp

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point, given the size of the surface area of the end relative to other dimensions of the structure.

Claim 89: See layers (11B) and (12) at the end.

Claim 90: The structure is formed as a part of a cantilevered structure, because, prior to connection to the chip, only one end of the structure was attached.

Claim 91: The flexible core is (11A) and the shell is (11B).

Claims 101-102: See Column 7 at line 65 for the material of the layer on the core or the shell.

Claim 95: The diameter of the core can be .25-.3 mm, column 2 at line 22, less the thickness of the shell layer, top of column 8, (too small to affect the above number to more than 1/1000).

Claim 98: The structural limitations of this claim are identical to that of claim 87 and the shell is layer (11B).

Claims 99-100: As the material of the shell is the same as the claimed invention, the physical properties of yield and tensile strength are inherently met.

Claim 106: The substrate is (1).

Claim 107: See figure 1A.

Claim 108: The product resulting from this product-by-process claim is the same as the structure of Kanji. Therefore, Kanji properly anticipates this claim.

Claim 109: The core is (11A) and the shell is (11B).

Claim 110: For the material see column 7 at line 65.

Claim 112: The Cu of the core is taught at column 7, line 63. The Cu has small amounts of Be in the form impurity.

Claim 113: The structural limitations of this claim are identical to that of claim 109,

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and therefore taught by Kanji.

Claim 114: Consider the substrate (4) and the component package (2). The first intimate bond is that of the core with conductive contact terminal (8) and the second intimate bond is where the layer (11B) contacts (8) adjacent the first bond.

35 U.S.C. § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103[®] and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

8. Claim 96-97, 103-105 and 111 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kanji .

Claims 103 and 111: Kanji discloses the claimed invention as explained with respect to claims 92, 87 and 110 except for the core being made of Au. Nevertheless, it would have

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been obvious to one of ordinary skill in the art, at the time the invention was made, to make the core from Au for superior electrical conductivity, because gold is a routinely used as a contact structure in the electronic industry.

Claim 96: Kanji discloses the claimed invention as explained with respect to claim 87 except for the diameter of the core.

Kanji discloses that the core can be reduced from the usual size to 0.3 mils, column 2 at lines 20-22. Nevertheless it would have been obvious to make the diameter of the core any size necessary including 0.5-3 mils, because selection of any known diameter based on design requirements is well known. The diameter may be chosen larger to adapt the structure for higher current carrying capacity, for better mechanical support or for reduced manufacturing cost in low lead density packages where smaller contact structure sizes are not needed.

Claim 97: Kanji discloses the claimed invention as explained with respect to claim 87 except for the length of the core. Nevertheless it would have been obvious to make the length of the core any size necessary to yield the spacing of the package and board as mandated by design requirements, because selection of the size of contact structures to meet dimensional requirements is a matter of common sense.

Claims 104-105: Kanji discloses the claimed invention as explained with respect to claim 91 except for the thickness of the shell being 0.25 to 10 mils. Kanji discloses that the shell can be made of gold, but only discloses that a thickness of $1\mu\text{m}$ is required.

Nevertheless, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to make the thickness of the gold shell 0.25 to 10 mils for better conductivity and better protection of the core, because selection of the thickness of a coating layer depends on design requirements and is within the level of ordinary skill. As gold is a

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soft metal, increase of the thickness of the shell will not adversely affect the mechanical properties of the structures.

Response to Arguments

9. Applicant's arguments have been carefully reviewed, but are not persuasive.

The arguments on the indefiniteness of claims 88 and 90-91 are not supported by any evidence. Further, any particular error with respect to examiner's position is not pointed out. Applicant merely states that the examiner is incorrect. Examiner has reworded those rejection so they are more clear to the applicant, but maintains their validity because the language of the claims remains unclear.

On art, the main argument is that Kanji does not disclose freestanding structures. Examiner notes that freestanding means that the structure can support its own weight. This feature is true of the elements of the prior art. Freestanding is not synonymous "unattached at the end." Therefore, those arguments are moot.

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory

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period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Closing

11. Any inquiries concerning this communication or earlier communications from the examiner should be directed to Examiner Kamand Cuneo at (703) 308-1233. Examiner Cuneo's supervisor is Mr. Jeffrey Gaffin whose telephone number is (703) 308-3301.


Jeffrey Gaffin
Supervisory Patent Examiner
Technology Center 2800


K. Cuneo
Patent Examiner, Group 2841
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